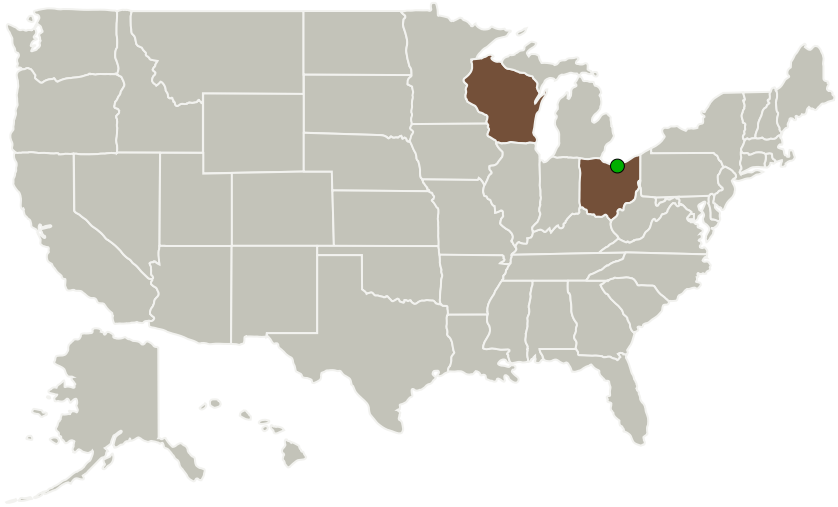
Lattice Regenerative Cooling Methods (LRCM), Phase I

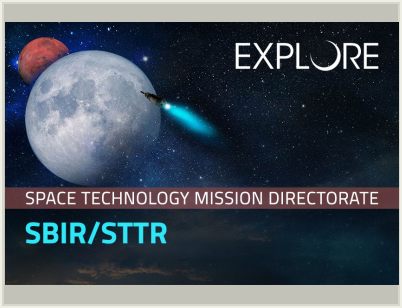
Completed Technology Project (2012 - 2012)

Project Introduction

ORBITEC proposes to develop and demonstrate a novel cooling concept called Lattice Regenerative Cooling Methods (LRCM) for future high thrust in-space propulsion systems. Incorporation of ORBITEC's innovative lattice structures in the fabrication of thrust chambers for expander cycle engine systems will maximize the heat transfer into the coolant fluid, expand design options, enable substantial cost savings, and reduce lead times for component fabrication. Using rapid prototyping technology, the LRCM hybrid fabrication approach allows for the rapid casting of near-net shape metallic thrust chamber components. The lattice passages allow for turbulent flows through the cooling jacket which induces mixing in the coolant. During Phase I, monolithic chamber wall sections incorporating the LRCM lattice structure will be fabricated and tested in a hot-fire test conditions in ORBITEC's propulsion testing facilities.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Sierra Nevada Corporation(SNC)	Lead Organization	Industry Women-Owned Small Business (WOSB)	Sparks, Nevada
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
Orbital Technologies Corporation	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Madison, Wisconsin

Primary U.S. Work Locations	
Ohio	Wisconsin

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138247)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sierra Nevada Corporation (SNC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

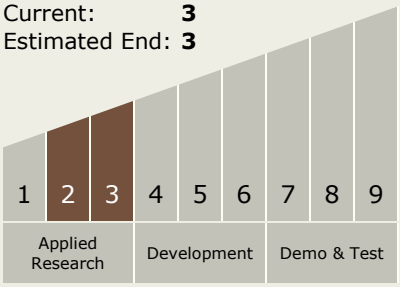
Carlos Torrez

Principal Investigator:

J. Arthur Sauer

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System